Asian Mushrooms Could Help Fight Prostate Cancer

A mushroom used in Asia for medicinal purposes has suppressed prostate tumour successfully in mice during early trials.

Polysaccharopeptide (PSP), a compound extracted from the "turkey tail" mushroom, was found to target prostate cancer stem cells and suppress their formation in mice, says a new study conducted by senior research fellow Patrick Ling.

Ling, from the Institute for Biomedical Health and Innovation (IHBI) at the Queensland University of Technology (QUT) added that the results could be an important step towards fighting a disease that kills 3,000 Australian men a year, reports the journal Public Library of Science ONE.

“What we wanted to demonstrate was whether that compound could stop the development of prostate tumours in the first place,” said Ling, according to a Queensland statement.

“In the past, other inhibitors tested in research trials have been shown to be up to 70 percent effective, but we’re seeing 100 percent of this tumour prevented from developing with PSP. Importantly, we did not see any side effects from the treatment.”

Ling said conventional therapies were only effective in targeting certain cancer cells, not cancer stem cells, which initiated cancer and caused the disease to progress.

During the research trial, in collaboration with the University of Hong Kong and Provital Pty Ltd, transgenic mice that developed prostate tumours were fed PSP for 20 weeks.

Ling said no tumours were found in any of the mice fed PSP, whereas mice not given the treatment developed prostate tumours. He said the research suggested that PSP treatment could completely inhibit prostate tumour formation.

New Lung Cancer Treatment Discovered

Researchers looking for better ways to treat tumours in children say they may have stumbled instead on something even better – a new therapy for lung cancer, Australia’s single biggest cancer killer.

Lung cancer is the fifth-most commonly diagnosed cancer in this country, accounting for 9703 diagnoses in 2007 – fewer than half the 19,403 new prostate cancer cases recorded the same year.

It also lags well behind bowel cancer (14,234 cases), breast cancer (12,670) and melanoma (10,342).

But lung cancer remains far and away the single most deadly cancer, claiming 7626 lives in 2007 – nearly double the number of...
the next-biggest, bowel cancer (4047).

Part of the reason lung cancer remains so deadly is that it is often detected relatively late, and is often difficult if not impossible to remove surgically.

But scientists at the Children’s Cancer Institute Australia, in Sydney, have found a new approach that promises to tackle another reason why the prognosis for most patients with lung cancer can be so poor: the tendency for their tumours to resist chemotherapy drugs.

Maria Kavallaris, the head of the CCIA’s tumour biology and targeting program, and a former president of the Australian Society for Medical Research, said her team used a “gene-silencing” approach to knock out the gene in the cancer cells that made them resistant to the effects of chemotherapy.

The findings, presented at the Australasian Gene Therapy Society meeting in Melbourne yesterday, have so far been tested successfully in mice, and Professor Kavallaris said she hoped human trials would begin next year.

“When we switch off this gene, and treat the cancer cells with the chemotherapy that they weren’t responding to before, then they become responsive,” Professor Kavallaris said.

“It’s still early days, but it’s showing great promise. It’s very encouraging.”

The researchers are still trying to work out how best to deliver the drug to cancer cells in live patients — such as injection, or steady infusion through a drip.

It is hoped the therapy, if successful in later trials, could also prove useful for solid cancers in children, such as neuroblastoma — which is one of the most aggressive childhood cancers.

A new treatment for childhood cancers such as neuroblastoma was what the CCIA team were looking for when they realised their therapy could be of benefit to adult patients as well.

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**Gene Behind Rare Brain Disorder Identified**

Scientists have identified the gene responsible for Kufs disease — a rare but fatal hereditary brain disorder, usually identified in early adulthood.

Kufs is activated by fat build-up in brain cells, causing symptoms like epilepsy, dementia, impaired motor function and intellectual deterioration. It affects approximately one in a million people.

Scientists from the Walter and Eliza Hall Institute and the University of Melbourne have used innovative new technologies to identify the gene responsible for Kufs.

The discovery will make it possible to diagnose the disease through a blood test rather than a brain biopsy, reports the American Journal of Human Genetics.

Melanie Bahlo, Katherine Smith and Catherine Bromhead from Eliza Hall’s Bioinformatics division, along with neurologist Sam Berkovic and Todor Arsov of Melbourne University, have found that mutations in the CLN6 gene on chromosome 15 are the cause of inherited Kufs type A disease.

Berkovic said identification of the CLN6 gene would enable more efficient and much less invasive techniques for earlier diagnosis of Kufs disease, according to a Melbourne statement.

“Currently, the only way we can reliably diagnose this disease is to do an invasive and dangerous brain biopsy, or at autopsy,” Berkovic said.

“The discovery of the gene at the root of Kufs type A disease will enable us to use a rapid and simple blood test to genetically test for the disease.

Bahlo’s and Smith’s innovative work used data generated from a person’s DNA, called SNP genotyping.

“The genetic cause of Kufs disease has remained a mystery for over 25 years, because the rarity of the condition meant that our patient groups were so small we couldn’t reliably pinpoint any particular genetic mutations that caused their disease,” Bahlo said.
China Bans Controversial Drug for Kids Below 12

China’s State Food and Drug Administration (SFDA) issued a circular on Friday banning the use of Nimesulide, an anti-inflammatory drug, for children under the age of 12, considering potential side-effects such as liver and kidney damage.

Nimesulide is a non-steroidal anti-inflammatory drug that first became available in Italy in 1985. It is now used in more than 50 countries and regions.

The drug entered Chinese markets in 1997. According to the SFDA, while common adverse reactions to the drug include vomiting and stomach ache, domestic and overseas statistics indicate that more severe issues are related to the drug, such as blood coagulation disorders, decreased white blood cells and damage to liver and kidney.

Previously, the SFDA only prevented the use of the drug among children one year old or younger. Also, the SFDA ordered the suspension of the production, sales and use of Duxil (almitrine and raubasine compound) due to its “unobvious” efficacy.

According to the SFDA, clinical research found “little” evidence proving the drug effectively improves the cognitive ability for patients suffering vascular cognitive impairment. The drug was supposed to treat symptoms related to cognition and sensory nerve damage.

The moves came after a two-month nationwide campaign was launched earlier this month to probe the quality of essential drugs and ensure drug safety. Official figures show that China’s National Center for Adverse Drug Reaction Monitoring received 692,904 reports of adverse reactions in 2010, up 8.4 percent compared with those in 2009.

Among the total, 109,991 cases involved new or severe adverse reactions, a year-on-year increase of 16.2 percent.

Ovarian Cancer Treated with Immunotherapy

A 54 year old patient with Ovarian Cancer has been successfully treated with AIET (Autologous Immune Enhancement Therapy; www.immunotreatment.org) by Nichi-In Centre for Regenerative Medicine (NCRM), Chennai. NCRM, jointly with their collaborating institutes, using proven Japanese technologies has achieved this feat. In the treated patient, the cancer which had spread to liver and spleen has stopped growing further and other metastases have shrunk. The patient now goes about doing her routines as before, according to a paper on this clinical work presented in the Second International Immunotherapy Congress, held recently at Budapest, Hungary (www.canceritim.org). The results were lauded by the international faculty.

Generally, advanced stage Ovarian cancer has a very poor prognosis. In the case presented at the international congress, the patient was operated for ovarian cancer and given chemotherapy in June 2009. The cancer recurred in July 2010 and spread to liver, spleen and lymph nodes (Stage IV) for which only limited treatment options were available. Along with chemotherapy the patient was given the AIET, which uses the patient’s own Natural Killer cells, the key immune cells that continuously do the surveillance for cancer cells and viruses and nip any cancer in the bud. These NK cells are taken from the patient’s blood and multiplied in the laboratory manifolds and re-injected to destroy the cancer cells, which has been in clinical practice in Japan since 1990s and the technology for multiplication of NK cells using patient’s own serum was developed by Dr.Hiroshi Terunuma of Biotherapy Institute of Japan, Tokyo, a co-author of the work.

The patient showed significant improvement in her quality of life and the cancer markers which were above 230 (CEA-125) before the treatment, have come down to normal around 4 U/mL according to Dr. Ramanan, Oncologist, Chennai, who is following up the clinical status.

Cancer cells are formed everyday in our body, which are curtailed by the immune surveillance system and NK cells play a major role in controlling the cancer cells. When the balance between the cancer causing and the controlling mechanisms is lost, it becomes a full blown disease and the AIET employs the
innate potentials of our immune system to fight cancer. In this patient, since her own immune cells are used, there is no rejection or adverse reactions. It is well proven in randomized clinical studies published in peer-reviewed journals. The safety and efficacy of the cell based immunotherapy, when combined with other conventional modalities of treatment is also well established.

“One of the major advantages with our methodology is that we do not use any allogenic or other types of feeder layer, but use only the patient’s own serum for growing the NK cells, which has added advantages of safety,” says Dr. Abraham, who presented the work in the meeting. He also added that early diagnosis and intervention were very important for better prognosis.

NCRM, an Indo-Japan joint venture institute has been providing ALET for cancer since 2005. It is probably India’s only centre providing Autologous NK cells-based cancer treatment. Further details about the treatment and the publications are available at www.immunotreatment.org.

### Gene Card Tells What Drugs to Avoid

Scientists have launched a project to develop India’s first personal genetic data cards — credit card-sized plastic-and-magnetic devices that could dramatically expand access to personalised predictive medicine.

In its first phase, the project will capture genetic data to predict a person’s likely response to more than 100 drugs to help him avoid taking medicines that may not benefit him or may cause him serious side-effects.

Scientists also hope to use genetic data to generate probabilistic forecasts of individuals’ susceptibility to a range of diseases — from select cancers to single-gene disorders, from diabetes or heart disease to certain neuro-psychiatric disorders.

A person may get a card by offering a blood or saliva sample that scientists will use to develop a genetic profile. It costs about Rs 15,000 to make the card in the laboratory.

Doctors will be able to scan the card with a mobile phone and access gene-related data stored on a distant computer. But senior science administrators caution that India will need to establish rules for confidentiality and security of genetic data before public release of such cards.

“We’re asking ourselves, ‘Is our society ready for what genome science can offer?’” said Samir Brahmachari, director-general of the Council of Scientific and Industrial Research (CSIR) and the third person to acquire a prototype card after two project scientists.

Genetic testing for disease susceptibility has long sparked concerns about employers or insurance agencies procuring such data in countries where testing is available.

“We’re also concerned about how individuals might use sensitive data,” a project scientist said.

The Indian Council of Medical Research is working with the biotechnology department to develop guidelines for confidentiality of genetic data. This is in progress but is yet to be embedded in law, biotechnology secretary Maharaj Kishan Bhan said.

The project, initiated by researchers at the CSIR’s Institute for Genomics and Integrative Biology (IGIB), New Delhi, stemmed from their study of how gene variations can tell whether a person will or will not respond to a common drug prescribed for asthma — salbutamol.

Since the salbutamol-gene link was discovered about a decade ago, scientists worldwide have established correlations between people’s genetic makeup and their likely response to several other medicines, from antibiotics to anti-cancer drugs.

Research has also revealed associations between gene variations and a large number of diseases. “Genetic susceptibility may be strong or weak,” said Rajiv Sarin, director of the Advanced Centre for Treatment Research and Education in Cancer (ACTREC), Mumbai.

Genetic susceptibility predictions are strong in some forms of breast cancer, ovarian cancer and intestinal cancer, said Sarin, who is not associated with the IGIB project.

The ACTREC itself offers free genetic
testing for breast and ovarian cancers. Sarin estimates that among the 100,000 new cases of breast or ovarian cancers in India each year, at least 5,000 would be hereditary and that each of these patients’ families would benefit from genetic testing.

Project scientists at the IGIB said they were trying to determine what bits of genetic information would benefit patients in India the most and to find ways of storing the information in a secure format.

The scientists say that predictions of susceptibility to disorders such as diabetes or heart disease, or to the risk of developing cancer after tobacco use, would have low reliability because such conditions involve multiple genes as well as environmental factors. At best, probability forecasts for such conditions might stir people into changing their lifestyles.

“But genetic data on response to drugs will be of enormous value to doctors — they could avoid giving drugs that won’t help or drugs that will cause serious side-effects,” Brahmachari said. The IGIB researchers are talking to doctors to determine the set of drugs most relevant to Indian needs.

Although the technology itself could be ready within months, project scientists declined to speculate how soon the cards could be made available for public use, saying confidentiality and security issues needed to be resolved first.

Genetic profiling services have been available from some foreign companies and, for limited applications, from Indian diagnostic companies. But they typically offer tests for genetic variations linked with specific illnesses or response to specific drugs.

The biotechnology department had ushered in predictive medicine in India during the 1990s, offering prenatal genetic testing for pregnant women to screen foetuses for genetic disorders such as Duchenne muscular dystrophy, Huntington’s disease or Fragile X Syndrome.

Biotechnology officials estimate that several thousand couples have used genetic screening and terminated pregnancies in which the foetuses were likely to develop genetic disorders.

Some researchers say there are signs that patients in India are able to handle sensitive genetic data responsibly.

“It is not uncommon (to find) one member of the family, say a daughter trying to protect her mother from guilt, requesting us not to tell her mother that she has passed down the gene mutation to her,” Sarin said.

Yet concerns about abuse of genetic testing persist. In a land where women face discrimination, “what would be the impact of a genetic test that reveals an unmarried young woman to be a carrier of a single-gene disorder (that she could pass on to her offspring),” asked a senior scientist associated with the project.

IISc, Deakin Join Hands to Fight Cancer with Nanotechnology

The Indian Institute of Science (IISc) and Australia’s Deakin University have joined efforts to build a nanotechnology-based drug delivery system to target cancer stem cells. Deakin University scientists led by Wei Duan, director of Deakin Medical School’s nanomedicine programme, have developed a ribonucleic acid (RNA) antibody nearly one-tenth the size of a natural antibody to act like a guided missile to seek and bind to cancer stem cells. “IISc would be joining hands in producing nano-sized lipid particles that will encapsulate the desired drug and other cancer- targeting epitopes (part of a molecule recognized by the immune system) for delivery,” Wei said in an email interview. “The assembling and testing, clinical trials will be done in our laboratory.”

The project has a funding of about 4.14 crore, with 80 lakh sanctioned by India’s department of science and technology and $700,000 (3.34 crore) by the Australia-India Strategic Research Fund. Cancer treatment currently uses two main approaches—chemotherapy that uses chemicals and radiation therapy using laser beams to kill cells cells. A third approach is based on nanotechnology. Therapies like polymer nanotubes carrying anti-cancer drug and building nano-particles to replace the DNA in cancerous cells with healthy ones are in the research stage. In a targeted drug delivery system, antibodies that bind to target cells and stimulate the immune system to attack
Indian Govt to Introduce First Five-in-One Vaccine

India is introducing a pentavalent vaccine shortly. It will be more beneficial to Indian children.

On 16th June of 2008, the NTAGI (National Technical Advisory Group on immunization) had recommended the introduction of pentavalent vaccine.

New Test for Pain Tolerance

Women preparing to give birth may soon be able to have a genetic test that predicts how much pain they are likely to experience and the sort of painkillers they will need.

Professor Alex Sia, an obstetric anaesthetist at Singapore’s KK Women’s and Children’s Hospital, said studies had shown that people’s perception of pain and reaction to different painkiller drugs varied according to genetic make-up and ethnicity.

He said a study of about 1000 Chinese, Indian and Malay women that measured how much pain they reported after a caesarean section, found that Indian women complained much more about their pain than the Malay and Chinese women. The Indian women also consumed much more morphine as a result.

Furthermore, the research showed that all women with a particular gene variation, regardless of ethnicity, reported significantly higher pain than the other women. In some cases, these women consumed three times the amount of morphine compared to the others. There was also an association between the genetic variant and how much a woman experienced side effects of morphine, including nausea and vomiting.

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Professor Sia said the research was an exciting step in the discovery of links between genes, pain and individual responses to different painkillers. Although there were many other factors in pain perception, including one’s psychological state, he said the research could lead to a genetic test for doctors to take a blood sample and tailor anaesthetics and painkillers.

He said the aim is to be able to identify the full range of genes associated with pain. “That would mean that if someone comes in for surgery we could take a drop of blood to know ... their requirement for analgesia and..."
THE National University of Singapore (NUS) has topped the charts as the best university for medicine in Asia, in the new Quacquarelli Symonds (QS) World University Rankings by Subject for Life Sciences and Medicine.

NUS was ranked 18th globally. The rankings looked at universities worldwide, based on their academic reputation, employer reputation and research citations.

NUS was also placed 22nd for Psychology and 28th for Biological Sciences.

Dean of NUS Yong Loo Lin School of Medicine Professor John Wong, who is also deputy chief executive of the National University Health System, said that he is honoured for the school to be ranked among the top medical schools in Asia.

He said: 'We are privileged to be recognised for the impact that our great faculty and students have made, and continue to make, in our common vision of doing our very best, be it in patient care, education, or research.'

Topping the worldwide charts for medicine is Harvard University, followed by University of Cambridge and Massachusetts Institute of Technology.

NUS deputy president (academic affairs) and provost Professor Tan Eng Chye said that they are delighted to have once again been placed among the best universities in Asia, and the world.

'With the continued support of our outstanding faculty, staff and students, NUS is well-poised to ensure that our education and research continue to be at the cutting edge, as well as locally and globally relevant.'

NUS has also performed well for other sets of rankings. The university was placed seventh globally for civil and structural engineering, 10th for chemical engineering, and 12th for computer science and information systems.

NUS Best University for Medicine in Asia

Pain relief,” he said, adding such a test could be in use within five to 10 years.

Professor Sia said this would be particularly helpful in maternity wards because there was a strong association between pain during and after child birth and depression, often affecting a woman’s ability to look after herself and her baby.

He said understanding individual responses to powerful drugs such as morphine could also improve patient safety.

Dr Sia cites respiratory depression, a potentially lethal complication that can result in patients given morphine.

“For some people, the dose that leads to respiratory depression in someone else is not enough to relieve their pain,” he said. “There has to be an explanation for this and that is what we’re hoping for”

Professor Sia presented the research to the Australian and New Zealand College of Anaesthetists annual scientific meeting in Hong Kong.

He said: ‘We are privileged to be recognised for the impact that our great faculty and students have made, and continue to make, in our common vision of doing our very best, be it in patient care, education, or research.’
In a world first, neurosurgeons in the US said on Friday electrodes implanted in the lower spine had enabled a paraplegic man to stand up unaided, move his legs voluntarily and, with help, walk on a treadmill.

The therapy marks an exciting advance in the quest to overcome crippling injuries of the spinal cord, they said.

“This is a breakthrough,” said Susan Harkema, a professor at the Spinal Cord Research Center at the University of Louisville, Kentucky, who led the 11-member team.

“It opens up a huge opportunity to improve the daily functioning of these individuals...but we have a long road ahead.”

The work, published online by The Lancet, was carried out on a young volunteer, now aged 25, who had been completely paralysed below the chest after a tragic hit-and-run accident in 2006.

Today, after 26 months of retraining of the leg muscles, followed by the pioneering surgery, the patient can reach a standing position and support his own weight for up to four minutes at a time.

Helped by a harness support and some assistance from a therapist, he can make repeated stepping motions on a treadmill. He can also voluntarily move his toes, ankles, knees and hips on command.

The patient, Rob Summers, said he was ecstatic.

“This procedure has completely changed my life,” he said.

“For someone who for four years was unable to even move a toe, to have the freedom and ability to stand on my own is the most amazing feeling.”

“To be able to pick up my foot and step down again was unbelievable, but beyond all of that, my sense of wellbeing has changed. My physique and muscle tone has improved greatly, so much that most people don’t even believe I am paralysed.”

Paralysis comes from damage to the spinal cord down which the brain sends electrical signals along nerve fibres to instruct limb movement.

The research focuses on nerve networks in the lower spine that are relatively autonomous — they can follow through the commands for weight-bearing and coordinated stepping without input from the brain.

The mechanism works thanks to feedback from nerves in the muscles of the legs and feet that is sent directly to the spinal cord.

It is this sensory input that helps the individual to adjust his balance and speed of movement and level of weight-bearing in response to surfaces and inclines.

“The spinal cord can independently interpret these data and send movement instructions back to the legs — all without cortical cerebral involvement,” explained Reggie Edgerton, a professor of integrative biology and comparative physiology at the University of California, Los Angeles.

The technique entailed giving Summers 26 months of locomotor training to get his leg muscles used again to the sensation of movement, thus reviving the feedback system.

Surgeons then implanted 16 electrodes in the lumbosacral spinal cord, connecting them to thick nerve bundles that largely control movement of the ankles, hips, knees and toes.

The unit then sends down electrical signals to mimic those sent down the spine by the brain in order to initiate movement.

With Summers, electrostimulation was part of sessions lasting up to 250 minutes.

The success has fired hopes that at least some individuals with spinal paralysis can use a portable stimulation unit to trigger the movements needed to stand up and bear weight.

With the help of a walker, it is hoped, such patients would maintain balance and execute some effective stepping.

There could be even greater secondary benefits, including perhaps the restoration of bladder and sphincter control and sexual response.

But only one person has so far had the treatment, out of five authorised by the US Food and Drug Administration (FDA).

Summers, while completely paralysed below the chest, was rated a “B” on the US classification of spinal injury, as he did retain some feeling below the spot where the damage occurred.

So it is unknown whether the procedure will work on “A” patients, who have no sensation below the injury. In addition, Summers is young and was extremely fit before his accident.

Drugs are being developed to heighten the sensitivity and function of the spinal cord neural network, which could further enhance the technique.
Scientists Discover Protein that can Halt Spread of Breast Cancer

Scientists have discovered a protein that is capable of halting the spread of breast cancer cells.

The protein could also lead to a therapy for preventing or limiting the spread of the disease.

“Cancer researchers want to design new therapeutic strategies in which the metastasis or spreading stage of cancer can be blocked,” Andrew Craig, lead researcher and a professor in Queen’s Department of Biochemistry and Cancer Research Institute, explained.

"Patients stand a much better chance of survival if the primary tumour is the only tumour that needs to be treated," he said.

The regulatory protein identified by Craig’s team inhibits the spread of cancer cells by removing and breaking down an invasive enzyme on the surface of cancer cells.

If it remains unchecked, this enzyme degrades and modifies surrounding tissues, facilitating the spread of cancer through the body.

Craig hopes that his team’s findings may help develop more targeted therapies that have a specific inhibitory function on this enzyme that is implicated in certain metastatic cancers.

Traditional therapies that have been used to counteract the invasive nature of this particular enzyme also destroy other enzymes that are important for the body’s normal physiological function.

The researchers examined a network of proteins that are responsible for controlling the shape of cancer cells.

They focused specifically on parts of the cell that protrude into surrounding body tissues, allowing the cancer cell to degrade surrounding tissue barriers.

Normal cells also produce similar protrusions as part of a healthy physiological process that allows cells to move through body tissues during an immune response.

During the spread of cancer these normally healthy mechanisms are co-opted by cancer cells, allowing the cancer to break through tissue boundaries and colonize distant tissues.

This process of cancer spread is known as metastasis and is frequently the cause of cancer-related deaths.